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Summary:

This essay reviews the mechanisms by which the Brazilian national "Housing-Finance System" adjusted the principals of its savings and lending instruments for inflation, since the system was founded in 1964. The history of the adoption by the System of different "index-linking plans" is recounted. The contradictions and other difficulties of the various index-linking plans is explained by the inherent difficulty of having index-linked mortgages in a society in which wages, and indeed most other kinds of earnings, are not index-linked.

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Introduction.

In any nation with a private financial market, the market for housing finance is singularly vulnerable to sustained inflation. The reasons are clear enough. Mortgages are by nature long-term contracts, but inflation turns the future real value of the monetary unit uncertain--hopelessly uncertain where the future is ten or fifteen years, which is the order of magnitude of a mortgage contract. Consequently, suppliers of finance capital will prefer to avoid the housing-finance market. So much the worse, of course, if the interest rates in the housing-finance market are subjected to unrealistic controls.

This essay describes how Brazil established a housing-finance market in spite of circumstances of sustained inflation. The principal innovation, we shall see, was the introduction of ex post financial index-linking on savings instruments of the housing sector--that is, the introduction of savings instruments that guaranteed a certain real, not nominal return. This seems a sensible solution at first sight, and the idea has been considered even in nations that have far less serious inflation problems than Brazil. But in Brazil index-linking created a new problem that proved rather difficult to resolve: If the savings instruments were denominated in real terms, then the assets backing them--i.e., the mortgages--would also have to be denominated in real terms. But under the circumstances of the late 1960s, what Brazilian household would--or could--undertake a liability denominated in real terms? In what follows we recount how the Brazilian authorities found a solution to this problem. The solution, we will argue, was not entirely satisfactory; it violated the index-linking principle in some ways, and came very close in the end to amounting to having nominal mortgages financing index-linked savings with the help of what were, in effect, government subsidies.

The background of Brazil's housing problem.

On March 31, 1964 a military-civilian coup d'etat in Brazil toppled the vaguely populist, ineffective government of President João Goulart. The coup was the culmination of a sustained political and economic crisis which seemed, in the opinion of many observers, to be leading inexorably toward social chaos, and perhaps communist or fascist rule. In the view of the military and of a large part of their civilian support, the crisis was the manifestation of fundamental deficiencies and dissonances in the Brazilian economy and social structure, and these failings were beyond the capacity of the existing political system to resolve. The new government, under the widely-respected General Humberto Castello Branco, wanted time and power to elaborate the policies it thought were necessary to enable the nation to develop in a secure and steady way. Consequently, for the first time in Brazilian history, the armed forces decided to retain power indefinitely, rather than return the nation to civilian government after a brief transitional period as they had done on certain earlier occasions. Although the army dominated the new government, the ministries and the principal government institutions (apart from those concerned with national defense) were placed under the direction of highly competent civilians, who have since come to be described as "technocrats". It was hoped that these civilians could formulate appropriate policies without being subjected to conflicting political pressures.[1]

The principal economic manifestation of the crisis were a severe acceleration of inflation; a prolonged industrial recession; and a growing housing shortage. The recession and the housing shortage were

unquestionably due in large measure to the inflation. Brazil had had an inflation problem for many years, because rapid industrialization and the construction of a new capital city had made lavish demands on the nation's resources through the 1950s.[2] In the early 1960s the inflation accelerated sharply, however: the percentage increases in the general price index were 30.5 for 1960, 47.7 for 1961, 51.3 for 1962, 81.2 for 1963, and an annual rate of 110.0 for the first three months of 1964.[3] (See Table 1.) The Goulart Administration clearly had no viable program to control the inflation by 1964: its major stabilization effort, the Dantas-Furtado Program, had lasted only through the first six months of 1963 and then been abandoned.[4]

At the time of the coup it was clear to most observers that the main cause of the accelerating inflation was the attempt by the federal government to seize an increasing share of the national income through an increasing budget deficit. Once the inflation had turned serious, the government could no longer sell Treasury obligations to finance the deficit. There was a usury law in effect, which limited nominal interest rates to twelve per cent per year. Strictly speaking this was not really the problem, for the bonds could always have been sold at a heavy discount. The real problem was that the rate of inflation finally became so unpredictable that it was not possible even to guess what rate of discount would have been appropriate for the bonds. The principal causes of the growth of the federal deficit were the large wage adjustments granted to government employees, particularly one heavy increase granted in late 1963, and heavy subsidies to public enterprises, particularly to those engaged in

transportation.[5] The deficit was financed by voluminous issues of currency: in spite of the attempt at stabilization during the early part of 1963, 84 percent of the government's deficit for the year was financed by money creation, and the money supply increased by 64 percent over the year.

When the new government assumed power and took stock of the situation that it had inherited, it quickly concluded that it could not bring either the deficit or the inflation under control in the short run. To have done so would have meant either raising taxes drastically, or else dismissing government employees and suspending vital national investment programs. These would have been politically impossible, and at all events the new government did not wish to deepen the industrial recession any further. The new government did introduce a more stringent mechanism for preparing the government budget, but it accepted the fact that it would have to live with a high deficit for some time to come.[6] At the same time, however, the government's economics team, led by the Ministers of Finance and Planning, Dr. Octávio Gouveia de Bulhões and Dr. Roberto Campos respectively, conceived an imaginative plan to mitigate the inflationary impact of the deficit. Under Law 4357 of July 16, 1964 the government was authorized to issue "Re-adjustable National Treasury Obligations" (ORTN)--index-linked bonds. These bonds, of two-, three-, and five-year maturities, were to be re-adjusted every three months according to the wholesale price index compiled by the Fundação Getúlio Vargas, an autonomous government institution responsible for a broad range of

statistical services including various price and output indices and the national accounts. Interest of six to seven per cent per year was to be paid on the re-adjusted principals. Given the lag in data collection and processing, the re-adjustment of the bonds to be made at the beginning of each quarter was to be based on a three-month moving average lagged three months. Thus, an adjustment at the beginning of month t would be made according to the following formula: V_t represents the value of the bond at the beginning of month t and I_t represents the wholesale price index for month t, the new value of the bond would be

$$V_t = V_{t-1} \frac{I_{t-4} + I_{t-5} + I_{t-6}}{I_{t-7} + I_{t-8} + I_{t-9}}$$

This formula was modified a number of times over the years following.[7] The bonds can never have been said to have provided a perfect inflation correction, but at least until the mid-1970s they came as close as was feasible: to all intents and purposes, the bonds provided a positive and near-certain real rate of return. (See Table 2.) The government was therefore able to market these bonds to the public to finance its deficit.[8] (See Table 3.) By the early 1970s the deficit was eliminated, but the ORTN continued to be issued to serve as assets for various institutions that used them to back their own index-linked liabilities. The same law that instituted the ORTN also provided for index-linking of tax debts in arrears, to stimulate prompt payment of taxes (previously the penalty payment had been only one per cent per month on the unpaid balance, so that it was profitable to evade tax payments for as long as possible); and it also introduced index-linking of fixed corporate assets

for the purpose of calculating depreciation, so that firms' accounting statements would yield more realistic profit figures.[9]

It is important to understand both the background of sustained inflation and the government's "gradualist" approach to controlling its deficit and the inflation in order to understand the approach that the government decided upon to resolve the national housing shortage. By 1964 the housing shortage had become critical: the filthy, disease-ridden shanty towns that ringed Brazil's cities were growing inexorably, and had even become internationally famous. The rapid industrialization of the country had induced heavy migration into Brazil's cities: in 1960 Brazil's urban population was about 32 million, whereas in 1940 it had been only about 13 million.[10] This migration entailed a vastly increased demand for housing, but the inflation, in combination with the usury and rent-control laws intended in part to resist the inflation, served to discourage the finance and construction of new housing. Private financial institutions could not legally pay savers sufficiently high rates of interest to cover what their accounts lost in purchasing power to monetary depreciation, and the same law prohibited their receiving interest on mortgage loans sufficient to prevent their being de-capitalized. The housing programs of the National Social Insurance Institute (INPS) and the "Popular Home Foundation," which had begun to operate in the 1950s, had collapsed. By the early 1960s only a small number of official and semi-official institutions, among these the Caixa Econômicas Federais and Estaduais (the federal and state thrift institutions), continued to provide housing credit. Even these institu-

tions had to ration and restrict their lending; hence access to mortgage credit became a matter of privilege. The rent-control legislation, which had a continuing history going back to 1946, aggravated the effect of inflation on housing construction: although rent levels were permitted to rise a number of times, they were never permitted to rise sufficiently, and they made rental of residences a highly unprofitable and uncertain business.[11]

By early 1964 the Brazilian housing-finance market had virtually ceased to exist. The rent-control law in effect was Law 4240 of June 28, 1963; a rent fixed under this law lost more than half its value by the same date a year later. With inflation running at around 100 percent per year, there were no savings available for housing: in March 1964 the Caixa Econômica Federal announced a "temporary suspension" of its mortgage programs;[12] and the statistical bulletin of the Getúlio Vargas Foundation, Conjuntura Econômica, reported that in that month the Rio de Janeiro real-estate market presented the lowest transaction volume since the bulletin began to record its activity in 1947.[13] The crisis at least had the virtue of demonstrating that the housing situation had to be reformed entirely, and that the rent-control and usury laws were part of the problem, not the solution.

The Brazilian National-Housing Finance System: the problem of inflation adjustment.

Having introduced index-linked bonds in the public-finance sphere, the government reasoned that the index-linking principle might also be applied in the housing-finance sector. A law was drafted by the new government and submitted to Congress for rapid debate: it was signed as Law 4380 on August 30, 1964. The law instituted a National Housing

Plan, the name of which was later changed to the "Housing Finance System" (SFH). It provided for the chartering of private Real-Estate Credit Societies, Savings-and-Loan Associations, housing cooperatives, and other institutions which were to serve as "financial agencies" of the new system. A few years later the mortgage programs of the Caixas Econômicas were also brought into the new system. A new National Housing Bank (BNH) was established as an autonomous federal institution: this was to serve the SFH broadly in the way that a central bank serves a commercial-banking system, acting as a central organ of finance, control, and day-to-day regulation of the system. At first the BNH was financed by a one-per-cent payroll tax on all employees covered by the labor legislation and a forced twenty-year (index-linked) loan of 4 percent of residential rents, levied on the landlords. Later on, as we shall relate, the BNH financing system was completely changed. Most interesting for our present purposes, the law provided that contracts for sale, construction, and mortgage of private houses could--but did not have to--contain provisions to re-adjust amortization payments and outstanding balances according to the national minimum wage--note, not according to the government-bond index--sixty days after any date that the minimum wage was changed.[14] The Real-Estate Credit Societies and the BNH were authorized to emit "Housing Bills," which could be index-linked in the same way as the government's own ORTN. The law also authorized the use of index-linked savings accounts.

The housing and construction markets were made more attractive to firms and individuals through reforms in the old rent-control legislation.

Law 4494 of November 25, 1964 provided that all new rental leases would be index-linked on an annual basis, while old rental leases would not be index-linked but would be permitted to make an additional upward adjustment each year so that eventually their real value would be brought up to an appropriate level.[15] This was part of the new government's policy of permitting "corrective inflation," i.e., bringing certain prices that had been regulated at artificially low levels by the previous government up into line with the current price level.[16] Later, Decree-Law 322 of April 4, 1967 limited the indexation of rents originally contracted before 1964, but eliminated all controls on rental leases signed after the date of the Decree-Law.[17]

Between 1964 and early 1966 the new system remained bound up in planning and organization. A staff of considerable technical capability was assembled at the BNH headquarters in Rio de Janeiro. A number of issues had to be resolved. For one thing, it appeared that the agencies of the SFH that were being established were not capable of providing housing for the slum-dwellers (though it was recognized that by relieving the middle-class housing market the pressure on the lower-class housing market would be relieved). A partial solution to this problem was attempted by authorizing the establishment of "Popular Cooperatives," as special agencies of the system. Much of the new staff's energies were directed to determining how adjustment for inflation would operate in the BNH. The debate was intense, and politically charged. (The first president of the BNH, Sandra Cavalcanti, resigned in 1965, claiming that the SFH could not operate equitably with index-linking, although her

resignation also had other political motives.[18] A further problem of the new system was that it remained under-capitalized for the scope of the problem it was intended to solve.

The problems of what to do about inflation adjustment and of under-capitalization were resolved during 1966. In January 1966 the BNH, under its attribution of "orienting and controlling" the SFH, issued its "Instruction No. 5." Instruction No. 5 provided that the agencies of the SFH would not only index-link their assets and liabilities, but would do all their accounting in real terms, through the institution of the "Standard Capital Unit" (UPC) as the unit of account of the system. The UPC was simply the current par value of government index-linked bonds.[19] (Under Decree-Law 70 of November 21, 1966, which also authorized the establishment of Savings-and-Loan Associations, the UPC was instituted with a separate legal basis--to be calculated in the same way as the ORTN, but to continue as the unit of account of the SFH even in the event that the ORTN were discontinued).

As we have seen, the legislation that established the SFH originally provided that assets and liabilities would be adjusted according to the minimum wage. There was an important problem with this, however. Beginning in mid-1965 the government implemented an incomes policy to control wages: in effect, all major categories of wages henceforth were to be set once a year, each category in a particular month. The new wage level was to be set in such a way that, on the basis of a government projection of inflation for the coming year, the purchasing power of the wage for the coming year would be equal to the average purchasing power of the wage

over the previous 24 months. The minimum wage was to be set each year in May according to this policy.[20] Now clearly this meant that the minimum-wage adjustment would not be sufficient to compensate for the previous year's inflation. Between July 1964 and April 1966, the government-bond index rose by 76 percent while the minimum wage rose by only 33 percent. The government intended to continue this wage policy as part of its struggle against inflation. This created a dilemma for the SFH. On the one hand, if loans and obligations were adjusted according to the minimum wage, the system's creditors would be inadequately protected against inflation and the SFH would be de-capitalized; on the other hand, given that the minimum wage was being repressed, it would have been unfair to ask mortgage-holders of the income groups that the SFH aimed to serve to amortize their loans according to the ORTN index. Instruction No. 5 resolved this problem in the following way: all assets and liabilities of the SFH would be linked to the ORTN index, and these included the outstanding balances of all mortgages. But the monthly payments of amortization and interest on the mortgages could, if the mortgage-holder wished, be adjusted according to the minimum wage.[21]

This meant, in practice, that Instruction No. 5 allowed the mortgage-holder to elect one of two payments plans.[22] Under both, the outstanding balance of the mortgage was corrected every three months according to the ORTN index. Under what was called "Plan A," however, the monthly payments of amortization plus interest, calculated when the mortgage was drawn up in current cruzeiros, were adjusted annually according to the minimum wage, sixty days after the adjustment of the minimum wage. After 300 months,

if the mortgage were still not completely amortized, the monthly payments would be corrected thereafter according to the ORTN index. Under what was called "Plan B," the monthly payments of amortization and interest were corrected from the start like the outstanding balance, every three months according to the ORTN index. Under both plans, the monthly payments were determined initially in current cruzeiros according to the "French" Amortization Plan, or Tabela "Price" as it is known in Brazil. The French Amortization Plan determines the monthly payments of amortization and interest for a given mortgage, interest, and term in such a way that all the payments are equal. The Appendix describes the calculation of the French Amortization Plan and Plan A in algebraic terms.

Since Instruction No. 5 altered the dispositions of Law 4380 regarding adjustment within the SFH for inflation, special legislation had to be submitted to Congress to modify Law 4380. This legislation had been drawn up and debated in Congress during 1965 and the early part of 1966. In the congressional debates important opposition to the index-linking concept emerged, and the legislation was amended to authorize the SFH to grant certain mortgages without fully index-linking their outstanding balance. On the advice of his economic ministers, who were keenly aware that the SFH could not operate fairly and rationally with both nominal and index-linked finance, the President vetoed those portions of the legislation permitting nominal mortgages. The legislation authorizing Instruction No. 5 was signed as Law 5049 of June 29, 1966. Congress actually over-rode the veto in August; again, on the advice of his economic ministers, the President responded immediately with

Decree-Law 19 of August 30, 1966.[23] This Decree-Law annulled all the legislation that permitted any form of nominal finance within the SFH, and legally established the provisions of Instruction No. 5 as obligatory.

At about the same time, a radical change was made in the financing system of the BNH. The BNH was considered under-capitalized for its task, as we have noted; at the same time, the social-security and unemployment-insurance schemes of the existing labor legislation were regarded as unsatisfactory on various grounds. A single solution was found for both problems: Law 5107 of September 13, 1966 created the "Job-Tenure Guarantee Fund" (FGTS). The FGTS was to be financed by a compulsory deposit made each month by all firms, in the amount of 8 percent of the total remuneration paid during the previous month to all employees covered by the FGTS. The deposit was to be made to special accounts associated with the name of each employee (and not with the firm, as was the case under the previous labor laws). These accounts were to be index-linked according to the ORTN and were to pay annual interest 3 to 6 percent (this was later reduced to 3 percent for all FGTS accounts). The employee, or his beneficiary, was to have access to the account when he was dismissed without due cause for any reason from his employment, or in the event of retirement, disability, or death. In addition, even where an employee left his employment voluntarily, he was to have access to his account for a number of purposes--for example, to capitalize his own enterprise, or, in the case of a woman, to get married. The FGTS was instituted without repealing the

old labor laws regarding indemnization of workers dismissed without just cause. Under the old laws, the worker received indemnization only when he was dismissed without just cause after at least one year in a given employment. To this day workers may choose to remain under the old laws or to enter the FGTS. A majority chose the FGTS at its inception, and workers entering the labor force since 1966 have almost unanimously preferred the FGTS. Under Law 5107, the resources of the FGTS were to be applied entirely in the BNH, thus making an enormous volume of savings available to the SFH. The FGTS rapidly became the BNH's principal source of funds, comprising more than three quarters of the BNH's total liabilities.[24]

During 1966 the first Real-Estate Credit Societies began to operate in Brazil's larger cities, and in 1967 the first Savings-and-Loan Associations were set up. During 1967 the SFH agencies began an expanded program of mortgage credit. It is clear that the character of the real-estate market changed radically during the first few months of the year. The construction industry revived, with powerful direct and multiplier benefits for national income and employment. In June 1967 a leader of the construction industry gave his opinion that "index-linking constitutes the greatest conquest of the [1964] Revolution, [on account of its] permitting the turn-over of resources dedicated to housing, through the maintenance of their real value."[25] Not everyone, however, was quite as pleased as this with the operation of index-linking in the SFH. Indeed as large numbers of people took on mortgages and saw how the mortgage-payments system operated, criticisms and protests began to mount. It was particularly disconcerting

for mortgage-holders to discover that, after having made a monthly payment or two, the nominal balance outstanding was higher than the original nominal value of the mortgage. Many mortgage-holders could understand neither the mechanism nor the rationale of the system, and many had taken on mortgages beyond their means on the supposition that inflation would erode the real outstanding balance as it always used to. There were protests from labor unions, and also from sectors of the military, who had had privileged access to what little mortgage credit had been available in the early 1960s.[26]

Part of the problem was that the BNH had done an exceedingly poor job of explaining the new system and its rationale to the public.[27] Public relations was a general failing of the technocratic policies that had been instituted since 1964: precisely because the technocrats' policies did not depend for their institution on a political constituency, they did not feel a strong compulsion to explain what they were doing to the general public. But the payments plans of the mortgages, with their outstanding balances index-linked and their amortizations adjusted according to the minimum wage, did have a number of troubling properties. Some of these were corrected early on, some only later. The first problem was that the amortization of a mortgage might last much longer than originally planned. The minimum wage was lagging well behind the ORTN index, and thus the outstanding balance was corrected at a faster rate than the monthly payments. It was widely feared that this meant that the outstanding balance could grow indefinitely and the mortgage turn eternal if the minimum wage continued to lag. These fears were certainly justified

in theory: as the Appendix shows, the outstanding balance could increase in real terms, after a monthly payment was made, if the monthly payment were insufficient to cover all of the real interest on the outstanding balance for the month. The view of the BNH staff was that this was highly unlikely to occur very often--over the long run, it was felt, the minimum wage simply could not be allowed by the government to continue to lag behind the price level. The public did not maintain such confidence, however.

The BNH made a first attempt to solve the problem through a Resolution of its Council, RC 30 of August 23, 1967. This provided that if any mortgage lasted fifty percent longer than its originally contracted term the BNH would pay the balance to the financing entity. A special fund was set up for this purpose in the BNH, called the Fund for the Compensation of Wage Variations (FCVS). It was financed by collecting from each SFH mortgage holder an amount equal to his first monthly payment at the time that that payment was made.[28]

A further problem with the payments scheme was that the annual increase in the monthly payments took place on July 1 of each year, sixty days after the annual increase in the minimum wage, but many mortgage-holders received the annual increase in their earnings at a different time of the year. The BNH solved this problem in late 1967 by introducing a "Plan C." Plan C was the same as Plan A, except that under a Plan C the mortgage-holder could decide at what month of the year his monthly payments would be adjusted.[29]

The introduction of the FCVS and of Plan C did not entirely resolve the problems of the mortgage-payments schemes. In the first

place much of the public still resented the escalation of outstanding balances and monthly payments. True, it was no longer possible for a mortgage to become eternal. Now, however, the fear was expressed that the FCVS could go bankrupt: if the minimum wage continued to lag behind the price index, the FCVS might accumulate more debt than it could pay off. It seemed at least possible that a given mortgage could end up, even after one-and-a-half times the originally specified term, with an outstanding balance greater in real terms than the original payment on the mortgage to the FCVS. In this case the particular mortgage would take more from the FCVS than it had put in. This was perhaps not likely--the technical staff of the BNH maintained a sanguine faith that the minimum wage could not be allowed to decline very much longer in real terms. After all there were national labor productivity gains, and consumer demand could not long withstand a declining real wage. But the eventual bankruptcy of the FCVS was a theoretical possibility, and proposals to change the system continued to be made. The introduction of Plan C created a problem of its own. Under Plan C, a mortgage-holder could put off the increase in his monthly payment for as much as eleven months after the time that it would have gone into effect under Plan A. By then inflation would have made this mortgage-holder's monthly payment smaller in real terms than it would be if he had chosen an earlier month.

To respond to the growing criticism of the amortization plans, the BNH announced a reform: through Resolution 36/69 of the BNH Administrative Council (November 1969), Plans A and C were replaced by a single "Wage Equivalence Plan" (PES), while Plan B was retained under the name

of "Index-linking Plan." Under the Wage-Equivalence Plan, the term of each mortgage would be fixed definitively at the signing of the mortgage. The initial contribution of one monthly payment to finance the FCVS was eliminated, but the FCVS was retained: if the accumulated increase in the minimum wage over the term of a particular mortgage were to turn out less than the accumulated increase in the ORTN index, the FCVS would pay what was still owed to the financing entity. On the other hand, however, if the accumulated increase in the minimum wage were to turn out more than the accumulated increase in the government-bond index, the mortgage-holder would nevertheless continue to make adjusted monthly payments until the end of the term originally specified. In this case, the mortgage-holder would pay more, in real terms, than he had borrowed; the original loan would be completely amortized before the end of the term, and after the point at which this happened the mortgage-holder's remaining payments would be paid into the FCVS. The PES also incorporated a mechanism to solve the problem created by permitting monthly payments to be adjusted at different times of the year. Henceforth, under the PES the mortgage-holder could decide at what quarter (not month) his monthly payments would be adjusted each year. A "Wage-Equalizing Coefficient" would be applied to the adjustment of the monthly payments: this was a kind of fine-tuned correction determined by the BNH through a complex formula—the longer the adjustment was put off after the increase in the minimum wage, the higher would be the correction coefficient applied.[30]

The PES was a peculiar reform. To many people it had the air of a political confidence trick based on the fact that the public still

understood so little of the technical intricacy of index-linking. Indeed, it is clear that the reform was designed for the maximum psychological effect, to avoid having to make a more drastic reform. One of the most important changes made under the PES was that mortgage-holders were simply no longer told what their outstanding balance was after they made their monthly payments. They did not need to know anymore, the BNH argued: the monthly payments were simply made as before, until the term was up. Only if a mortgage-holder wished to pay off his mortgage before its term was up would he be told its current outstanding balance. It is clear that the average Brazilian mortgage-holder tended to evaluate his situation by comparing his mortgage payments to what he would pay if he were renting a home, bearing in mind that mortgage payments would eventually come to an end and he would own his home; consequently the PES conformed rather sensitively to the psychology of the Brazilian mortgage-holder. A few months after the reform was announced, Conjuntura Econômica offered the view that "it would surely be an exaggeration to claim that the essence of the Wage-Equivalence Plan was a change of name, but one must not under-estimate the importance of the psychological escape valve..."[31] By establishing that the term of all SFH mortgages would henceforth be specified at the time they were signed, the BNH removed at a stroke the uncertainty attaching to the term of the mortgages, and the resentment that this entailed. But--curiously for a reform designed by proponents of index-linking--it accomplished this by turning the real amount to be paid by an SFH mortgage-holder uncertain, and quite likely to turn out greater or smaller than the original loan.

Only if the mortgage-holder selected the "Index-linking Plan" would he be certain that he would pay back in real terms exactly the same amount that he had borrowed. But this plan was simply too risky for many mortgage-holders. A Gallup poll in 1969 confirmed that most Brazilians still believed that the growth of the minimum wage would continue to lag behind that of the price level. It had lagged behind since 1962. The BNH reasoned that eventually the growth of labor productivity must pull it up--hence, as Conjuntura Econômica put it, "there is no reason whatever for a priori fears for the fate of the [FCVS]."[32] The public pessimism revealed by the Gallup poll was probably based not only on the previous eight years' experience, but also on the view that the government was generally regarded as pro-business; that there was considerable leeway within which the government could set the minimum wage; and that it would probably continue to be set with a view to controlling inflationary cost pressures. The Brazilian economy was growing rapidly, but so was the number of new entrants into the labor force; hence new entrants could be compelled to accept a low wage, while older members of the labor force could move on to higher-paying jobs.

By the end of the 1960s, then, the SFH was operating with a peculiar mortgage-payments system that did not quite work according to the index-linking principle. Given the government's wage policy, the PES was arguably the best compromise possible. It conformed to the Brazilian mortgage-holder's psychology remarkably well, and it seems to have reduced the public complaints quite dramatically. It placed the SFH as a whole in a somewhat precarious position, at least theoretically, because the BNH's

obligations--particularly the FGTS--were index-linked according to the ORTN index. It is possible that this meant that the SFH could not provide as much subsidized, low-income housing as it should have, because the real interest rates for low-income programs were lower than those for programs serving the middle classes. During the 1970s the decline in the real value of the minimum wage was arrested, and the real minimum wage appears to have been roughly stabilized. This relieved the mortgage-payments problem considerably, and as we shall relate the SFH found it possible to reduce the cost of mortgage finance.

In the late 1960s the SFH began an active program of index-linked passbook savings. This has proven to be the most successful application of the index-linking principle in Brazil; indeed, there are grounds for believing that after 1974 the passbook-savings program proved too successful from the point of view of the Brazilian economy as a whole.[33] Index-linked passbook savings accounts were made available at the private agencies of the SFH, particularly the Real-Estate Credit Societies, the Savings-and-Loan Associations, and the federal and state Caixas Econômicas, and they carry a government guarantee up to a limit which is itself index-linked. Their growth to date has been extraordinary, and they have apparently had some success in attracting savings from relatively poorer people. The larger financial institutions outside the SFH have also incorporated passbook-savings programs into their operations, although only the agencies of the SFH work exclusively with index-linked liabilities. The passbook savings accounts generally pay about 6 percent interest per year, with quarterly index-linking calculated on the smallest of three balances on the first

day of each of the three months of the previous quarter. There is generally a period of six months after a new account is opened before interest and index-linking is credited to the account. Until 1974 deposits made up to the fifteenth of each month were considered to have been made on the first of the month, and deposits made after the fifteenth were considered to have been made on the first day of the next month, for purposes of calculating interest and index-linking. After November 1974 the grace period was reduced from fifteen to five days. The SFH agencies continued to issue index-linked housing bonds, though during the 1970s the public has come to prefer the liquidity of the passbook savings.[34] By the start of the present decade, the mechanisms of inflation adjustment within the SFH were pretty much settled. The liabilities of the SFH--the FGTS, the housing bonds issued by the private agencies of the SFH, and the passbook savings accounts--were all index-linked according to the ORTN index. The mortgage-payments of the system were all adjusted according to the PES, save for the small proportion of mortgages that were completely index-linked. The accounting of the SFH was done in terms of the UPC, a unit that was linked to the ORTN index. The passbook-savings accounts were extremely popular, and they grew through the 1970s; in addition the FGTS accounts were index-linked. Broadly speaking, then, the index-linked liabilities of the SFH, which were essentially public assets, were accepted and popular. The mortgages were far less popular, although the institution of the PES had clearly improved their public acceptance. Nevertheless complaints about the mortgages continued.

In an interview with this writer, Dr. Rubens Vaz da Costa, who served as president of the BNH from 1971 to 1974, reported that the mortgage-payments scheme was his most persistent public-relations problem.[35] Those few people who had access to mortgage credit before 1964 naturally found the SFH payments system dis-advantageous when compared with the earlier nominal mortgage scheme; that was only understandable. But there were other people who still found the escalating monthly payments perplexing and expensive. It was clear that too many people were taking on mortgage obligations beyond their means, and the BNH struggled against this problem with great difficulty. On certain occasions mortgage-holders who were having problems meeting their payments were permitted to change their mortgages.

Around 1970 the SFH found that, with funds coming in from the FGTS and the passbook savings accounts, the liabilities of the system were growing faster than the assets. The BNH concluded that it was in a position to make mortgage terms more attractive, and throughout the 1970s it took various steps to reduce the cost of mortgages. At the same time, as the real minimum wage stabilized and it came to seem possible that it would even rise, the problems associated with the PES took on a different character. If the real minimum wage really did begin to rise, mortgages would be amortized unnecessarily rapidly.

A number of measures were taken to meet these problems. Law 5705 of September 21, 1971 provided for reduced mortgage rates and lengthened terms. Decree-Law 1188 of the same date provided a fiscal incentive: 20 percent of the monthly payments made during a given year could henceforth

be deducted from personal income taxes.[36] This measure affected a relatively small part of the Brazilian public, since only a small percentage of Brazil's population falls into income brackets sufficiently high to incur income tax. Following these changes, the BNH decided to make a change that ran somewhat in the opposite direction: it replaced the Tabela "Price" with a "System of Constant Amortizations" (SAC) as the means of calculating the monthly payments to be made on mortgages. Henceforth, the monthly amortizations made in each month were to be equal, and the monthly payments would consist of the amortization and the interest on the (index-linked) outstanding balance. The monthly payments would be calculated at the signing of the mortgage, and then adjusted according to the PES. Under the SAC, the first monthly payments (in real terms) would be higher, and then decline over the term of the mortgage, rather than remain constant. This would seem a regressive change, since the real monthly payments under the SAC would fall while an average family's real income would rise. It was justified on two grounds. The first was that the real-estate market would respond to the relaxation of mortgage rates and terms made the previous month by raising the price of real estate; increasing the initial mortgage payments, it was hoped, would tend to offset this. The second was that Brazilians had always been accustomed to falling real monthly payments on their mortgages, and the SAC was more in keeping with this.[37]

Further reductions in the SFH rates were effected during 1972. This was part of a general government effort to reduce interest rates in all of Brazil's financial sector. Resolution 235 of the National

Monetary Council (the nation's monetary authority, under the chairmanship of the Finance Minister) of September 14, 1972 provided for a general reduction of the rates of interest on liabilities and assets of the SFH. In addition, the same Resolution provided that no scheme of inflation adjustment could exceed the adjustment of the ORTN. In the SFH this effectively meant that if the minimum wage rose by more than the accumulated adjustment of the ORTN over the preceding year, the ORTN adjustment would be used to adjust the monthly payments. Consequently, monthly payments could not rise by more than the ORTN index. Finally, the same Resolution provided that interest rates must all be expressed in annual terms, not quarterly terms. This in itself effectively lowered interest rates that had previously been expressed in quarterly terms and had been compounded quarterly. After December 1972, index-linking on POTS accounts was to be applied annually, not quarterly as previously.[38]

In 1974 the government extended the benefits of the fiscal incentive provided in 1971 to all mortgage-holders, not merely those who paid income tax. Decree-Law 1358 of November 12, 1974 eliminated the 1971 fiscal benefit, and replaced it with credit certificates to be given to all mortgage-holders in the value of 10 percent of the monthly payments that had been paid during the previous year. Decree-Law 1431 of December 5, 1975 increased the percentage to 12 percent, and also raised the minimum and maximum amounts that could be so credited under the previous law.[39]

A number of other changes were made in the operations of the SFH throughout the 1970s, but these are outside the scope of the present essay, which is the method of adjusting for inflation employed by the

SFH. We should note, however, that in 1975 and 1976 substantial changes were made in the way the the ORTN adjustments are made, as part of a broader government objective to reduce the attractiveness of index-linked assets vis-a-vis nominal assets.[40] In August 1975 the government announced that henceforth the adjustment could be reduced, if the increase in the price index was due, in the view of the government, to "accidental" factors, such as the agricultural disasters that plagued Brazil during 1975. In May 1976 a more drastic change was made: henceforth the ORTN adjustment would be made according to the formula

$$.8 \cdot \dot{p} + .2 \cdot 15\%$$

(in annual terms), where $\dot{p}$ is the adjustment that would have been made under the previous formula. It was hoped that in this way the "inflation-feedback" effect of index-linking on the economy would be weakened.[41]

Conclusions.

What lessons can be drawn from the institution of adjustment for inflation in the Brazilian Housing-Finance System? Some of our conclusions seem rather obvious a priori. One hardly needs to refer to the Brazilian experience to be convinced that in an inflationary context people are pleased enough to hold index-linked assets but would rather not undertake index-linked obligations. Thus it is not surprising that the Brazilian public accepted the index-linked social insurance fund quite happily, and demonstrated considerable enthusiasm for index-linked housing bonds and passbook savings; nor is it surprising that the mortgage-payments schemes generated controversy and protest.

What is perhaps most interesting about the experience of the SFH is the dilemma that the BNH staff faced in 1966 when it drew up Instruction No. 5. The BNH staff reasoned, correctly, that it would be impossible to finance a nation-wide mortgage program unless the SFH guaranteed its liabilities against the (unpredictable) erosion of their value through inflation. In other words, long-term liabilities would not be subscribed in terms of a depreciating monetary unit. Thus the BNH staff proposed that the SFH employ a unit of account that maintained its purchasing-power value, the UPC. The problem--and this is the heart of the index-linking dilemma--was that liabilities in terms of the UPC must be backed by assets denominated in the same unit of account. These assets, however, would be liabilities of the public. Given that the national monetary unit was still the cruzeiro, it was impossible for the public to back its UPC liabilities with UPC assets, for the assets of the public must, perforce, be largely in terms of the monetary unit. In particular, wage contracts under the Brazilian incomes policy were still denominated in terms of the cruzeiro. Thus the BNH staff had to struggle to make the mortgage-payments scheme compatible, on the one hand, with the UPC liabilities of the SFH and, on the other hand, with the cruzeiro assets of the public.

The solutions that the BNH staff reached, in Instruction No. 5 and in the PES, must be regarded as ingenious, even if imperfect, considering the nature of the problem that they were up against. It has manifestly proved successful, at least to the extent that the SFH has grown and expanded its programs. It is clear that the SFH has not been able to

provide as much low-cost housing for persons of lower-income classes as it ought to have on grounds of social criteria: Brazil's larger cities still have too much sub-standard housing. But the SFH has financed a large amount of new housing construction; and even if it is true that the direct beneficiaries of this were middle class, the housing market as a whole was considerably eased. Moreover, since 1968 the BNH has provided credit to municipalities for construction of urban infrastructure. The value that this has had for Brazil's urban development cannot be over-estimated.

All the same, to return to our theme, the Brazilian public has clearly not liked index-linking, and it is likely that if it had been able to choose it would have preferred to do without it altogether. But given the inflationary circumstances, it was probably the only viable solution for the national housing shortage, and it was probably the only means by which savings could be accumulated. It was precisely for situations like this that the military felt that they had to retain power: there were too many Brazilian problems of this kind that required unpopular, long-term solutions, solutions that a more democratic regime could not provide.

One final observation. We have considered the SFH and its problem of adjusting to an inflationary context from a rather limited perspective, and this has kept certain other issues off the stage. We have observed that the particularly remarkable achievement of the BNH staff was that it managed to solve the problem instituting a constant-purchasing-power unit of account in an economy that has continued to use a depreciating

monetary unit as its unit of account. The rest of Brazil's financial system, apart from the federal Treasury (which is a special case, since obviously a government that can compel the creation of new money need not worry in the same way as private firms about the backing of its own obligations), has not been able to resolve this dilemma. Brazil's industrial and commercial finance continues to be denominated in the monetary unit. Now this has placed the SFH in a peculiar position. Since its liabilities are index-linked, its competitive position in the market for investable funds is exceedingly strong. Indeed, ironically, its position is the stronger, the higher and the more uncertain is the rate of inflation. This writer has argued in separate works that the competitive pressure of the availability of index-linked assets has had severe effects on other financial institutions--particularly Brazil's investment banks, stock markets, non-bank financial intermediaries, and commercial banks. In situations of rising inflation, such as have occurred in recent years in Brazil, this pressure has caused severe problems for Brazil's financial system.[42] In evaluating the success of the modes of inflation-adjustment employed by Brazil's SFH, these problems should not be ignored, even though they are beyond the limited scope of the present essay.

Appendix

1. Without index-linking, the French Amortization Plan operates as follows. Given a mortgage of S_0, a monthly rate of interest r, and the number n of monthly payments to be made, the size of each monthly payment P is given by

$$P = \frac{r(1+r)^n}{(1+r)^n-1} S_0 \tag{1}$$

This formula is derived as follows. Let I_t be the interest payment to be made at time t, A_t the amortization to be made at time t, and S_t the outstanding balance <u>after</u> the payment at time t. The point of the plan is that for all t

$$P = A_t + I_t = \text{constant}. \tag{2}$$

By definition,

$$S_t = S_{t-1} - A_t; \tag{3}$$

the interest payment is calculated as

$$I_t = rS_{t-1}. \tag{4}$$

Substituting (3) and (4) into (2) gives

$$S_{t-1} - S_t + rS_{t-1} = P,$$

or $$P = (1+r)S_{t-1} - S_t.$$

Hence $S_1 = (1+r)S_0 - P,$

$$S_2 = (1+r)S_1 - P$$

$$= (1+r)^2 S_0 - (1+r)P - P,$$

$$\vdots$$

$$S_t = (1+r)^t S_0 - P \sum_{t=0}^{t-1} (1+r)^t. \qquad (5)$$

Since $S_n = 0,$

$$0 = (1+r)^n S_0 - P \sum_{t=0}^{n-1} (1+r)^t,$$

and

$$P = \frac{(1+r)^n}{\sum_{t=0}^{n-1} (1+r)^t} S_0 .$$

Now $$\sum_{t=0}^{n-1} (1+r)^t = (1+r)^{n-1} \sum_{t=0}^{n-1} \left[\frac{1}{1+r}\right]^t$$

$$= (1+r)^{n-1} \left[\frac{1-(\frac{1}{1+r})^n}{1-(\frac{1}{1+r})}\right]$$

$$= \frac{(1+r)^n - 1}{r}$$

Therefore

$$P = \frac{r(1+r)^n}{(1+r)^n - 1} S_0; \quad \text{Q.E.D.}$$

2. Plan A may be described as follows. Let p_t represent the ORTN price index at time t; w_t the minimum wage at time t; P_t the nominal monthly payment at time t; P the monthly payment calculated at the signing of the mortgage, through the French Amortization Plan; S_t the nominal balance after the monthly payment has been made; A_t the nominal amortization payment. Then

$$P_t = P \cdot \frac{w_t}{w_0},$$

and $$S_t = \frac{p_t}{p_0} S_{t-1} (1+r) - P \frac{w_t}{w_0}.$$

3. The operation of Plan A may be described simply as follows. Let P represent the nominal monthly payment of amortization and interest calculated according to the French Amortization Plan at t = 0, the time when the mortgage is signed. Let P_t represent the nominal monthly payment that will actually be paid at time t, S_t the nominal outstanding wage at time t, p_t the ORTN index at time t, and r the monthly interest rate. Then

$$P_t = P \cdot \frac{w_t}{w_0}, \tag{6}$$

and then the new outstanding balance is given by

$$\begin{aligned} S_t &= (1+r) \frac{p_t}{p_0} S_{t-1} - P_t \\ &= (1+r) \frac{p_t}{p_0} S_{t-1} - P \cdot \frac{w_t}{w_0}, \end{aligned} \tag{7}$$

i.e., the new nominal outstanding balance is given by the old balance, escalated by the ORTN index, multiplied by one plus the interest rate,

minus the monthly payment. It is clear that S_t may exceed S_{t-1}; it will if

$$[(1+r)\frac{P_t}{P_0} - 1]\, S_{t-1} - P\frac{w_t}{w_0} . \qquad (8)$$

4. Not only might the nominal value of S_t exceed that of S_{t-1}; the <u>real</u> outstanding balance may increase after a monthly payment has been made. The real values of S_t and S_{t-1} at time t are given by $S_t \frac{P_0}{P_t}$ and $S_{t-1}\frac{P_0}{P_t}$ (using the ORTN index as the deflator).

$$S_t\frac{P_0}{P_t} = (1+r)\, S_{t-1}\frac{P_0}{P_t} - P_t\frac{P_0}{P_t}$$

$$= (1+r)\, S_{t-1}\frac{P_0}{P_t} - P\frac{w_t}{w_0}\frac{P_0}{P_t} .$$

$$S_t\frac{P_0}{P_t} - S_{t-1}\frac{P_0}{P_t} = [(1+r) - 1]\, S_{t-1}\frac{P_0}{P_t} - P\frac{w_t}{w_0}\frac{P_0}{P_t} .$$

Consequently the real outstanding balance will increase if

$$P\frac{w_t}{w_0}\frac{P_0}{P_t} \text{ F } rS_{t-1}\frac{P_0}{P_t} , \qquad (9)$$

i.e., if the real monthly payment is insufficient to cover the real interest on the previous real outstanding balance.

NOTES

[1]See Skidmore (1967) pp. 253-330, for a history of the events leading up to the overthrow of the Goulart government and the assumption of power by the Castello Branco government.

[2]On the reasons for the Brazilian inflation of the early 1960s, see Baer (1965).

[3]Calculated from the table "Indice geral de preços", in the periodical Conjuntura Econômica, April 1977, p. 92.

[4]See Skidmore (1967), pp. 234-259 for a discussion of the Dantas-Furtado Program and its historical context.

[5]See Conjuntura Econômica, May 1964, pp. 15-17; also Baer, Kerstenetzky, and Simonsen (1965).

[6]See Kafka (1967), and Simonsen (1970), esp. pp. 23-40.

[7]For the history of the ORTN adjustment formulas, see Conjuntura Econômica, "Correção monetária e realimentação inflacionária," June 1976, pp. 88-94.

[8]See Chacel, Simonsen, and Wald (1970), pp. 111-113, and Baer and Beckerman (1974).

[9]See Baer and Simonsen (1965), Chacel, Simonsen, and Wald (1970), pp. 99-107, and Baer and Beckerman (1974).

[10]Kampel and Miranda do Valle (1974), p. 9.

[11]See Chacel, Simonsen, and Wald (1970), pp. 39-42. The very weakness of the housing-finance market may have prevented an inflationary demand for loans to build inflation-resistent luxury housing.

[12]Conjuntura Econômica, July 1964, pp. 49-52.

[13]Conjuntura Econômica, July 1964, p. 49. The political crisis of March 1964 was probably also an important factor.

[14]The provisions of Law 4380 are summarized in Chacel, Simonsen, and Wald (1970), pp. 123-124. See also Kampel and Miranda do Valle (1974).

[15]See Kampel and Miranda, pp. 147-148.

[16]See Ellis (1969).

[17]See Simonsen (1975), 66-67.

[18]In 1969, Sandra Cavalcanti discussed her views on the use of index-linking in the SFH in a newspaper interview. She felt that the SFH could not sustain its system of inflation adjustment, and she believed that the public complaints that arose against index-linking during the late 1960s proved her point. "What the Ministry of Planning failed to remember when it decided to institute the index-linking system within the BNH is that economics is not mathematics. Economics is people, unemployment, disaster, something human that a computer cannot resolve," she said. During 1965, she noted, in the limited operations that the BNH was then carrying out, a system of "inflation compensation" was employed: "the re-adjustment of the value of the amortization was in relation to current money and the amortization was calculated as 25 percent of the [mortgage-holder's] salary. And the purchasers [of homes] had, in this form, conditions to continue paying." She recommended that the SFH interest rates and the index-linking be modified, and perhaps subsidized through some economic activity of the state. Jornal do Brasil of Rio de Janeiro, "BNH defende a correção monetária e culpa a semântica," November 3, 1969, pp. 28-29.

[19]The provisions of Instruction No. 5 were explained to this writer by Dr. José Eduardo Oliveira Penna, the director of the BNH from December 1965 to March 1974, in several interviews granted in November 1976 and May 1977.

[20]See Fishow (1974), pp. 267-268. The wage policy is discussed throughout Simonsen (1970); the rationale of the policy is discussed on pp. 26-28.

[21]As explained to this writer by Dr. José Eduardo Oliveira Penna. See also Conjuntura Econômica, "O Plano de Equivalência Salarial e a correção monetária," March 1970, pp. 65-67.

[22]As long as the mortgage was below a certain ceiling; above that ceiling Plan B had to be used. Also, in practice, SFH agencies "strongly suggested" one plan or the other for particular mortgages.

[23]The "Decree-Law" is a legislative device used in Brazil and a number of other Latin-American nations. A presidential decree is issued, establishing immediately as law a disposition that would otherwise require congressional approval. The congress may then approve or disapprove the disposition: if it disapproves, the disposition ceases to be effective. In Brazil, the "Institutional Act No. 2" of 1965 (one of a series of extra-constitutional changes promulgated by the post-1964 governments) re-organized Brazil's political parties into a "government" party and an "opposition" party. The government party, as part of its "party discipline," is required to vote in Congress in favor of any Decree-Law. Since the government party has had a congressional majority since 1965, the Brazilian president has effectively held legislative powers since then.

[24]See Kampel and Miranda do Valle, pp. 41-47; also Conjuntura Econômica, "'Editorial,' Fundo de Garantia de Tempo de Serviço," October 1966, pp. 9-11.

[25]From a speech by Moacir Gomes de Almeida, an important construction entrepreneur and a member of the Sindicato de Construção Civil, a trade association of construction firms. Quoted by the Folha de São Paulo, June 1967.

[26]The debate is briefly mentioned in Kampel and Miranda do Valle, pp. 66-67, and in Conjuntura Econômica, "Mercado imobiliário--em discussão a correção monetária," September 1968. Dr. José Eduardo Oliveira Penna told this writer that he spent a large amount of his time between 1967 and 1969 responding to the public protests about the mortgage-payments systems. Dr. Oliveira Penna believed that the protests came principally from functionaries of the federal and state Caixas Econômicas who were used to working with nominal mortgages; from public servants and members of the armed forces who had had privileged access to mortgage credit before 1964; and from persons who had taken on excessive mortgage burdens. At one point, in 1968, Dr. Oliveira Penna offered to permit persons who wished to change the terms of their mortgage to do so. Dr. Oliveira Penna kindly showed this writer a file of documents that he maintained from the period. These include a memorandum by General Gerson de Pina, who was particularly active in the opposition to the mortgage-payments system; General Gerson de Pina made it clear that he did not oppose the index-linking principle, only that he was contrary to the precise way that the SFH had applied it, particularly where "those who live solely on wages and pensions" are concerned. He also suggested that the monthly payment never be permitted to exceed 30 percent of the mortgage-holder's income. "Some means must be found," he added, "to humanize the evolution of the outstanding balance, to stimulate the borrower to amortize the loan in the shortest possible term." Another document was a memorandum from an adviser to the national railway system's "Department of Assistance to the Railway Worker." This memorandum complained that the existing housing program of this department could not be modified to conform with the SFH system. The file also included a mathematical analysis by an actuary, showing that mortgages under Plan A could turn eternal (on grounds similar to those given in the Appendix to the present essay). Finally, the file includes various statements prepared by BNH officials in support of the index-linking principle and the mortgage-payments scheme. In an inflationary context, these argue, there is no other means to ensure the continued availability of funds for mortgage finance.

The public dissatisfaction with index-linking—in spite of the degree to which the public received index-linking through the FGTS and the passbook-savings accounts introduced in 1968—was considerable. The daily Jornal do Brasil of Rio de Janeiro published an opinion poll on September 9, 1969, p. 48. The public's response to the question, "In your opinion, index-linking ought to be _____?" was as follows:

reduced, 36 per cent; increased 4 per cent; left unchanged, 10 per cent, abolished, 36 per cent. The remaining 14 per cent had no opinion or did not know.

The Jornal do Brasil described the situations of three mortgage-holders in a feature article later that year. One was an engineer who had undertaken a mortgage with full index-linking (Plan B). His salary did not keep pace with the ORTN index, and he was now paying half his salary to cover his mortgage. Another was finding it so difficult to meet his payments that he was thinking of selling back his home to get out from under index-linking. A third, a poorer man, seems not to have understood that his mortgage was index-linked in any sense--apparently he had never heard of index-linking--but seemed to feel that his mortgage was a good enough deal. Jornal do Brasil, "BNH defende a correcão monetária e culpa a semántica," November 3, 1969, p. 28.

[27]This was recognized by the BNH staff. Dr. José Eduardo Oliveira Penna wrote a brief monograph in August 1968 entitled "Seven Errors and One Truth," in which he listed seven common mis-conceptions maintained by the public regarding the SFH mortgage-payments schemes and refuted them. These mis-conceptions were that the mortgage could become eternal; that the adjustments of the monthly payments would lag forever behind the adjustment of the ORTN; that the outstanding balance rose in real terms; that the rates were impossible to understand and arbitrary; that the monthly payment rose faster than the mortgage-holder's wage packet; that the mortgage-holder did not know what his mortgage would finally cost him; and that the government was profiting illicitly from index-linking. The monograph then noted as the one truth that the plans had indeed been poorly explained to the public. Characteristically, the monograph received limited circulation.

In an interview in 1969 with a reporter from the daily Jornal do Brasil of Rio de Janeiro, officials of the BNH suggested that the essence of the public-relations problem was psychological or semantic. "Perhaps we ought to call ... the index-linking of debts and monthly payments determination of their current value ("atualizacão de valor"). "The long-term tendencies of wages is to grow in real terms. Only those who do not believe in the country and do not believe in the possibilities and capacity of the Brazilian believes otherwise." Jornal do Brasil, "BNH defende a correcão monetária e culpa semántica," November 3, 1969.

[28]See the Conjuntura Econômica article cited in Note 21. Dr. Oliveira Penna explained this to the writer.

[29]Ibid.

[30]Ibid.

[31]Conjuntura Econômica, article cited in Note 20, p. 67. The reform was also discussed at the time by the newsweekly magazine Veja, which is a Brazilian equivalent of the United States' Time or Newsweek. Veja's article included the following observations. "The expression 'index-linking' has become damned [in the mind of the public]; the people are afraid to purchase houses and are afraid that they will not be able to meet their monthly payments." Hence, the article continues, a "psychological solution" has been presented through the adaption of the PES. But [the PES] is not all illusion, since through the new plans, the purchaser [of a home] receives a large gift: he will be able to conclude the payment of his home." "Behind the decision lies the conviction that the country will manage to overcome inflation in the short run and thus that index-linking will end at once." The Brazilian press, as these excerpts from Veja's contemporary coverage illustrate, was generally hostile to the index-linking concept, and was not really very helpful in explaining the idea to the public. Quotations from "Habitacão: Uma correcão psicológica," Veja, September 26, 1969, p. 32.

[32]Conjuntura Econômica, article cited in Note 21, p. 66.

[33]See Beckerman, "The Trouble . . ." (1978).

[34]On the resources of the SFH, see Conjuntura Econômica, "O Sistema Brasileiro de Poupanca e Empréstimo," March 1974, pp. 65-70. This article is part of an "Estudo Especial" of Conjuntura Econômica on the SFH, March 1974, pp. 45-117.

[35]Interview with Dr. Rubens Vaz da Costa on September 28, 1976.

[36]See Conjuntura Econômica, "Sistema Financeiro Habitacional-Recursos superam aplicacões," September 1972, pp. 86-89, p. 86.

[37]See Conjuntura Econômica, "Tabela Price e o sistema financeiro habitacional," January 1972, pp. 55-58. The writer learned the principal justifications for the adoption of the SAC in an interview with Dr. José Roberto Rego Monteiro, the BNH staff-member who was the principal advocate of the change, December 3, 1976.

[38]See Conjuntura Econômica, "Sistema Financeiro Habitacional-crescimento tranqüilo," February 1973, pp. 94-100, p. 95.

[39]See Conjuntura Econômica, "Sistema Financeiro Habitacional-ferte expansão no ano," February 1976, pp. 165-174, p. 174.

[40]See Conjuntura Econômica, Inflacão, correcão monetária, e indices de precos," September 1975, pp. 91-94, esp. pp. 93-94.

[41]See Banco Central do Brasil, Relatório 1976, p. 137.

[42]See Beckerman, "The Trouble ..." (1978), and Beckerman, "Index-linked Financial Assets ..." (1978).

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TABLE 1. Measures of Brazilian inflation, output growth, and money-supply growth, 1961-1976; percentage changes, December/December.

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
(1) General price index	47.7	51.3	81.3	91.9	34.5	38.8	24.3	25.4	20.2	19.2	19.8	15.5	15.7	34.5	29.2	46.4
(2) Wholesale price index	53.2	45.5	83.2	84.5	31.4	42.1	21.1	24.8	18.7	18.7	21.3	16.1	15.6	35.2	29.4	44.9
(3) Cost of living in Rio de Janeiro	42.9	55.8	80.2	86.6	45.5	41.2	24.1	24.5	24.3	20.9	18.1	14.0	13.7	33.7	31.2	44.8
(4) Money supply	52.5	64.1	64.6	81.6	79.5	13.8	45.7	39.0	32.5	25.8	32.3	38.3	47.0	34.0	42.8	37.2
(5) Monetary base	61.8	62.1	69.9	86.2	66.6	26.4	25.2	46.5	29.9	19.4	34.2	25.6	42.7	32.9	36.4	49.8
Source: CE April 1977, calculated by this writer																
(6) Real gross domestic product	10.3	5.3	1.5	2.9	2.7	5.1	4.8	9.3	9.0	9.5	11.1	10.4	11.4	9.5	4.2*	8.8*
(7) Implicit deflator	33.3	54.8	78.0	87.8	55.4	38.8	27.1	27.8	22.3	19.8	20.4	17.0	15.5	34.0		
Source: "Inflation in Brazil", by A. Lemgruber, in L. B. Krause and W. S. Salant, Worldwide Inflation, pp. 395-448, Tables 1 and 2, pp. 400-401.																

*Provisional data. The 1975 figure is given by The Economist, March 13, 1976, p. 77. The 1976 figure is the preliminary estimate of the Fundacao Getulio Vargas announced in February 1977.

TABLE 2a. Nominal value of index-linked government bonds, in cruzeiros.

(After 1966, these were the values of the Standard Accounting Unit, or UPC, of the SFH.)

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
January		11.30	16.60	23.23	28.48	35.62	42.35	50.51	61.52	70.87	80.62	106.76	133.34
February		11.30	17.05	23.78	28.98	36.27	43.30	51.44	62.26	71.57	81.47	108.38	135.90
March		11.30	17.30	24.28	29.40	36.91	44.17	52.12	63.09	72.32	82.69	110.18	138.94
April		13.40	17.60	24.64	29.83	37.43	44.67	52.64	63.81	73.19	83.73	112.25	142.24
May		13.40	18.28	25.01	30.39	38.01	45.08	53.25	64.66	74.03	85.10	114.49	145.83
June		13.40	19.09	25.46	31.20	38.48	45.50	54.01	65.75	74.97	86.91	117.13	150.17
July	10.00	15.20	19.87	26.18	32.09	39.00	46.20	55.08	66.93	75.80	89.80	119.27	154.60
August	10.00	15.20	20.43	26.84	32.81	39.27	46.61	56.18	67.89	76.48	93.75	121.31	158.55
September	10.00	15.70	21.01	27.25	33.41	39.56	47.05	57.36	68.46	77.12	98.22	123.20	162.97
October	10.00	15.90	21.61	27.38	33.88	39.92	47.61	58.61	68.95	77.87	101.90	125.70	168.33
November	10.00	16.05	22.18	27.57	34.39	40.57	48.51	59.79	69.61	78.40	104.10	128.43	174.40
December	10.00	16.30	22.69	27.96	34.95	41.42	49.54	60.77	70.07	79.07	105.41	130.93	179.68

TABLE 2b. Value of government index-linked bonds, deflated by the wholesale price index and the general price index.*

deflated by: wholesale price index / general price index	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
January	0.0	8.31	9.29	9.15	9.25	9.27	9.28	9.33	9.38	9.30	9.15	8.97	8.65
	0.0	8.39	9.17	9.25	9.12	9.10	9.00	9.00	9.16	9.13	8.98	8.84	8.54
February	0.0	7.92	8.75	9.05	9.08	9.28	9.35	9.34	9.30	9.23	9.02	8.92	8.59
	0.0	8.00	8.78	9.06	8.96	9.11	9.07	9.40	9.11	9.06	8.83	8.77	8.44
March	0.0	7.78	8.71	9.10	8.96	9.33	9.41	9.32	9.24	9.22	8.91	8.85	8.47
	0.0	7.77	8.67	9.10	8.90	9.11	9.12	9.00	9.05	9.06	8.72	8.73	8.29
April	0.0	8.85	8.71	8.99	8.91	9.57	9.33	9.19	9.22	9.20	8.63	8.92	8.36
	0.0	8.70	8.60	9.00	8.85	9.19	9.06	8.88	9.04	9.04	8.45	8.75	8.18
May	0.0	8.68	8.59	8.98	8.96	9.61	9.46	9.11	9.25	9.20	8.29	8.95	8.28
	0.0	8.51	8.53	8.92	8.78	9.23	9.10	8.85	9.04	9.01	8.16	8.77	8.09
June	0.0	8.54	8.71	9.14	9.13	9.62	9.42	9.07	9.38	9.24	8.14	8.99	8.28
	0.0	8.38	8.69	8.93	8.90	9.24	9.06	8.81	9.11	9.03	8.05	8.79	8.05
July	10.00	9.57	8.90	9.32	9.15	9.48	9.35	9.01	9.46	9.24	8.27	8.92	8.34
	10.00	9.38	8.90	9.11	8.92	9.17	9.00	8.79	9.19	9.03	8.17	8.76	8.07
August	9.41	9.34	8.83	9.26	9.24	8.86	9.26	9.06	9.44	9.22	8.57	8.89	8.20
	9.41	9.14	8.85	9.13	9.01	9.10	8.92	8.84	9.21	9.04	8.42	8.72	7.97
September	9.12	9.51	8.82	9.33	9.29	9.17	9.14	9.18	9.40	9.20	8.87	8.79	8.04
	9.13	9.33	8.93	9.19	9.06	8.92	8.81	8.93	9.14	9.02	8.72	8.62	7.87
October	8.74	9.41	8.90	9.23	9.19	9.06	9.05	9.22	9.35	9.19	9.05	8.74	8.02
	8.79	9.21	8.93	9.10	9.02	8.82	8.73	9.00	9.10	9.01	8.88	8.59	7.87
November	8.35	9.34	8.89	9.16	9.16	8.98	9.11	9.30	9.33	9.11	9.08	8.70	8.13
	8.42	9.15	8.99	9.03	8.94	8.75	8.75	9.08	9.11	9.42	8.95	8.59	7.96
December	7.71	9.34	9.02	9.15	9.15	9.04	9.22	9.33	9.28	9.09	9.06	8.68	8.24
	7.87	9.17	9.12	9.02	8.98	8.80	8.90	9.14	9.08	8.92	8.93	8.56	8.05

*The interpretation of Table 2b: The value of the index-linked bonds has been determined each month by adjusting the previous month's value according to the wholesale price index lagged several months, using the following formula:

$$V_t = V_{t-1} \frac{I_{t-4} + I_{t-5} + I_{t-6}}{I_{t-5} + I_{t-6} + I_{t-7}} ,$$

where V_t is the value of the bond at time t and I_t is the wholesale price index. (Originally the index-linked bonds were adjusted every three months, according to the formula:

$$V_t = V_{t-1} \frac{I_{t-4} + I_{t-5} + I_{t-6}}{I_{t-7} + I_{t-8} + I_{t-9}} .)$$

The principal changes made in the calculation of the bond values were these: in 1969 a new wholesale price index was used, removing the wholesale prices of goods for export. In 1972 and 1973 a complicated formula was employed, weighting the above formula by 60 percent and making the remaining 40 percent of the formula depend on the government's target for inflation over the coming period. During 1974 the previous formula was adopted again. In August 1975 the wholesale price index was "purged" of price increases deemed to have been the consequence of the agricultural failures that occurred around that time, for purposes of calculating the bond readjustment. After April 1976 the adjustment formula became (approximately):

$$V_t = 0.8\, V_{t-1} \frac{I_{t-2} + I_{t-3} + I_{t-4}}{I_{t-3} + I_{t-4} + I_{t-5}} + 0.2 V_{t-1}\, (1.15)^{\frac{1}{12}}.$$

If the bonds were perfect hedges against inflation, the correction formula would be:

$$V_t = V_{t-1} \cdot \frac{I_{t-1}}{I_{t-2}} \cdot \quad (\S)$$

The first figure given for each month in Table 2b is the value:

$$\bar{V}_t = V_t \cdot \frac{I_{\text{June 1964}}}{I_{t-1}} \cdot$$

If the formula (§) had actually been used to adjust the bonds beginning in August 1964, this first figure would be 10.00. To the extent that our calculated figure falls short from 10.00, therefore, the bonds have failed to incorporate the full inflation (measured by the wholesale price index) that occurred since July 1964. To determine the real rate of return (net of interest) on a bond held between times t_o and t_1, calculate

$$\frac{\bar{V}_{t_1} - \bar{V}_{t_o}}{\bar{V}_{t_o}} \cdot$$

At least between 1965 and 1974, our table shows that index-linked bonds have pretty much retained their value. Between any given dates, however, the bonds do clearly have real gains or losses. The second figure given for each month shows the value

$$\tilde{V}_t = V_t \cdot \frac{I_{\text{June 1964}}}{G_{t-1}},$$

where G_t is the general price index.

TABLE 3. The Brazilian Federal Deficit and Its Finance. (Millions of new cruzeiros).

	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	-9-	-10-	-11-	-12-
	Revenues	Expenditures	Surplus or deficit (1)-(2)	Gross domestic product	(2)÷(4)	(3)÷(2)	(3)÷(4)	Financed by monetary authorities	-[(8)÷(3)]	Financed by public borrowing	-[(10)÷(3)]	(9)+(11)
66	5910	6496	-586	53724	0.12	-0.09	-0.01	-190	-0.32	606	1.03	0.71
67	6814	8039	-1225	71486	0.11	-0.15	-0.02	716	0.58	509	0.42	1.00
68	10275	11502	-1227	99879	0.12	-0.11	-0.01	1089	-0.88	138	0.11	0.99
69	13953	14709	-756	155695	0.09	-0.05	-0.00	-733	-0.97	1489	1.97	1.00
70	19194	58872	-738	206565	0.29	-0.01	-0.00	-839	-1.14	1577	2.13	0.99
71	26980	27652	-672	274267	0.10	-0.02	-0.00	-2022	-1.87	2694	4.00	2.13
72	37738	38254	-516	359133	0.11	-0.01	-0.00	-7685	-14.89	8201	15.89	1.00
73	52863	52568	295	477163	0.11	0.01	0.00	-6499	22.03	6204	-21.03	1.00
74	76810	72928	3882	676617	0.11	0.05	0.01	-8790	2.26	4908	-1.26	1.00
75	95446	95373	73	897194	0.11	0.00	0.00	-16356	224.05	16283	-223.05	1.00
76	166220	165797	423	1397829	0.12	0.00	0.00	-18594	43.96	19955	-47.17	-3.21

ource: Boletim do Banco Central do Brasil.

Table 4

Brazil's monthly minimum wage, 1966-1976
(New cruzeiros, and real value in 1965 prices)

	Rio de Janeiro		São Paulo		Porto Alegre	
December	nominal	real	nominal	real	nominal	real
1966	84.00	52.93	84.00	50.91	76.50	49.23
1967	105.00	53.14	105.00	50.75	95.63	50.41
1968	129.60	52.88	129.60	50.04	117.60	51.17
1969	156.00	51.23	156.00	49.13	141.60	51.49
1970	187.20	50.64	187.20	50.20	170.40	50.64
1971	225.60	51.57	225.60	50.17	208.80	51.71
1972	268.80	54.20	268.80	50.88	249.60	52.24
1973	312.00	55.34	312.00	51.63	288.00	49.86
1974	376.80	49.92	376.80	47.68	336.40	47.13
1975	532.80	53.81	532.80	51.47	484.40	49.09
1976	765.00	55.56	768.00	53.76	712,80	52.77

Source: Boletim do Banco Central do Brasil, III-1976, p. 151.

TABLE 5. The National Housing Bank, 1966-1976. (Millions of new cruzeiros, and as a percentage of total assets).

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Assets											
1. Liquid assets	31	43	39	41	30	24	60	133	737	380	254
	0.20	0.05	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.00
2. Re-financings	89	451	1873	3582	6231	9927	14205	19839	34062	53250	92836
	0.57	0.48	0.79	0.81	0.84	0.84	0.77	0.75	0.74	0.76	0.79
a. State housing companies	50	171	438	783	1412	1883	2374	2958	4142	5632	9366
	0.32	0.18	0.18	0.18	0.19	0.16	0.13	0.11	0.09	0.08	0.08
b. Caixas Econômicas (state & federal)	16	121	461	662	690	825	754	709	1466	2600	6582
	0.10	0.13	0.19	0.15	0.09	0.07	0.04	0.03	0.03	0.03	0.05
c. Housing cooperatives	14	68	224	601	1147	1981	2876	3462	3727	3431	2917
	0.09	0.07	0.09	0.14	0.15	0.17	0.16	0.13	0.08	0.05	0.02
d. Real estate credit societies	1	13	148	286	482	951	3377	5344	8190	13155	20933
	0.01	0.01	0.06	0.07	0.06	0.08	0.18	0.20	0.18	0.19	0.18
e. Savings and loan associations			17	117	224	340	960	1550	2812	5430	9650
			0.01	0.02	0.03	0.03	0.05	0.06	0.06	0.08	0.08
f. Commercial banks							2047	3927	8925	15333	31535
							0.11	0.15	0.19	0.22	0.27
g. Investment banks							783	1369	2487	3041	2978
							0.04	0.05	0.05	0.04	0.03
h. State development banks							317	351	876	1892	3574
							0.02	0.01	0.02	0.03	0.03
3. Security holdings	27	416	425	688	1047	1697	3702	4951	8715	11485	13604
	0.17	0.45	0.18	0.16	0.14	0.14	0.20	0.19	0.19	0.16	0.12
4. Total assets	155	934	2371	4389	7431	11888	18397	26384	46180	70394	117657
Liabilities											
5. Own resources	110	185	310	526	942	1553	2527	4354	9228	13558	20007
	0.71	0.20	0.13	0.12	0.13	0.13	0.14	0.17	0.20	0.19	0.17
6. FGTS		629	1902	3611	6040	9813	14788	20982	32897	48413	79011
		0.67	0.80	0.82	0.81	0.83	0.80	0.80	0.71	0.69	0.67

TABLE 6. Loans by the SFH to final borrowers, 1965-1976. (Millions of new cruzeiros)

ecember	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
. BNH total loans	19	89	451	1873	3582	6231	9927	14295	20620	34062	53250	92836
		+368.4	+406.7	+315.3	+91.2	+74.0	+59.3	+44.0	+44.2	+65.2	+56.3	+74.3
. BNH loans to final borrowers	19	72	303	993	2006	3762	5808	6057	7370	9286	11799	17584
		+278.9	+320.8	+227.7	+102.0	+87.5	+54.4	+4.3	+21.7	+26.0	+27.1	+49.0
. Loans by SFH agencies:		38	408	1771	3465	5839	10038	18386	30982	55552	89794	173424
			+973.7	+334.1	+97.7	+68.5	+71.9	+83.2	+68.5	+79.3	+61.6	+93.2
a. Caixa Econômica Federal		23	133	484	958	1736	2752	3942	5725	10375	21122	45201
			+478.3	+263.9	+97.9	+81.2	+58.5	+43.2	+45.9	+80.4	+103.6	+114.0
b. Caixas Econômicas of states		11	65	238	456	401	757	1237	2426	4725	7802	19326
			+490.9	+266.2	+91.6	-12.0	+88.8	+63.4	+96.1	+94.8	+65.1	+147.7
c. Real estate credit societies		4	196	763	1362	2284	3958	8624	14535	23330	32728	55126
			+4800.0	+289.3	+78.5	+67.7	+73.3	+117.9	+68.5	+60.5	+40.3	+68.4
d. Savings and loan associations				32	178	345	568	1436	2649	4834	7876	15664
					+456.3	+93.8	+64.6	+152.8	+84.5	+82.5	+62.9	+99.1
. Total loans by the SFH*	19	110	711	2764	5471	9601	15846	24443	38352	64838	101593	191008
		+478.9	+546.4	+288.7	+97.3	+75.5	+65.0	+54.3	+56.9	+69.1	+56.7	+88.0
. Total loans by the SFH-deflated (general price index)	19	81.8	381.1	1191.7	1881.6	2746.4	3715.4	4896.8	6652.9	7224.5	8760.6	11252.5
. Gross domestic product	36818	53724	71486	99879	155695	206565	274267	359133	477163	676617	897194	1397829
. Deflated (gen. p. index)	36818	38920.3	40378.4	45416.7	59628.9	64933.2	71586.7	80139.9	92490.3	101915.4	105819.1	116701.0
. Δ real loans | (real g.d.p.) Δ(5) ÷ (7)		0.00	0.01	0.02	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02

*Includes loans made by the SFH through commercial banks, development banks, and investment banks.

TABLE 7. Index linked passbook savings accounts in the SFH, 1970-1976.

Decembers	Number of accounts (thousands)				Average balance (new cruzeiros)				Total (millions of new cruzeiros)				Nominal return, previous 12 months			
	Caixas Econômicas	Real estate credit societies	Savings and loan assoc.	Total[a]	Caixas Econômicas	Real estate credit societies	Savings and loan assoc.	Total[a]	Caixas Econômicas	Real estate credit societies	Savings and loan assoc.	Total[a]	Caixas Econômicas	Real estate credit societies	Savings and loan assoc.	General price index
									261	49	20	330				
									752	81	60	893				
1970	598	188	163	1349	1801	851	822	1550	1797	160	134	2091	26.3	28.7	28.4	19.3
1971	1529	376	334	2239	2131	814	650	1669	3258	306	217	3781	30.3	32.7	32.4	19.5
1972	1900	771	563	3234	3366	1067	888	2387	6395	823	500	7718	25.6	26.9	26.7	15.5
1973	2490	1515	832	4837	4201	1789	1138	2919	10640	2710	947	14118	19.7	22.0	21.7	16.7
1974	3239	2414	1153	6806	6520	2501	1534	4250	21118	6037	1769	28924	38.4	40.9	40.4	34.5
1975	4442	3840	1656	9938	8950	3186	1958	5558	39756	12234	3242	55233	30.5	32.3	32.7	29.3
1976	5602	5733	2338	14142	13313	4590	3078	7915	74579	26314	7169	111934	41.4	41.4	43.7	46.3

[a]Includes other SFH agencies.

Source: Boletim do Banco do Brasil, April 1977.